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The effects of learning together technique which is based on cooperative learning on students' achieevement in mathematics class

Burcin Gokkurt [a] *, Sefa Dundar [a], Yasin Soylu [a], Levent Akgun [a]

[a]*Kazım Karabekir Education Faculty , Atatürk University, Erzurum, 25240, Turkey*

Abstract

The purpose of this study is to investigate the effects of cooperative learning methods and collaborative learning technique on 9th grade students' achievement in mathematics lesson. Worksheet developed for this purpose were applied to 9th grade of students in a secondary school for 4 hours in the second semester. In this experimental study, a pre-test and a post-test were used with an experimental group and a control group. There were 25 students in the control group and 25 students in the experimental group. While the classes were conducted by learning together technique which is based on cooperative learning method in the experimental group, they were conducted by the traditional learning method in the control group. Achievement Test consisting of 10 questions was used as data collection tool. Achievement scores acquired from pre-test and post-test scores were analyzed by using independent t-test in SPSS package program. As a result of this research, it was seen in secondary school 9th grade mathematics class that there is a significant difference between the levels of achievement between the experimental group where learning together was applied and the control group where traditional methods of learning were applied.

Keywords: Collaborative Methods, Learning Together Technique, Achievement, GCD-IPPC.

1. Introduction

Mathematics is a problem not only in our country but also in many developed countries. Researches studied in various countries have showed that teachers and teaching methods were effective in this issue. This research have indicated that teaching methods used in schools are simple expression method and mutual studies, small group works or alternative studies are not placed and education system based on rote-learning was made (Köroğlu ve Yeşildere, 2002). Therefore, instead of giving information by heart, methods and techniques, which activity students, should be used (Sengul and Ekinozu, 2004). Because of the fact that methods and techniques, which allow the active participation of students in the learning-teaching process, are applied, the students learn and remember better and faster and enjoy what they do (Oral, 2000) .

Nowadays, the new approaches that provide students' active participation in learning-teaching process have emerged, as a consequence of understanding that the educational problems and traditional education can not be

* Burçin Gökkurt. Tel.: +90-507-4479846
E-mail address :burcin.gokkurt@atauni.edu.tr

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solved. One of these prominent approaches is cooperative learning method (Yilmaz, 2004). Cooperative learning is viewed as a tool for preparing students to work in teams as requred in various employment settings, in the home, and in the community when there is a need to combine energies and work towards a common goal (Bolling, 1994 from cited in Doymuş, 2007). It is so important that this method, which allows the student's development with many aspects, are used especially in mathematics class ,in which makes students afraid. NCTM (1989) has published a report. The report shows that students ask questions each other, discuss their ideas, make mistake, learn to listen and make constructive criticism thanks to cooperative group work. It points out the role of learning mathematics because of paving the way for mathematical knowledge.Cooperative teaching method provide to students both academic and social benefits (Gillies, 2002).

1.1Cooperative learning

Cooperative learning is a learning approach that, they are helping each other learn about an academic subject, creating small mixed groups of students in the classroom in accordance with a common purpose and the groups success is rewarded in different ways (Gömleksiz, 1997:1). There are many different cooperative learning techniques. These are:

1.Team- game- tournament
2.Team suported personalization
3.Unified collaborative reading and writing
4.Group research
5.Cooperation-cooperation
6.Combination
7.Invention
8. Let's ask together and learn
9. Student teams-Success sections (Erçelebi; 1995: 10-11).

1.2 Learning Together

The learning together method is a technique developed by D.W. Johnson and R.T. Johnson. The most important features of this technique are the existence of the group goal and sharing the opinion and materials, division of labour and the group reward. During the first applications to put out a single product working in groups, sharing ideas and materials ,asking each other their questions before teacher have supplied to be rewarded.(Açıkgöz, 2003; 177). By considering the literature, we see more cooperative learning activities in the field of elementary mathematics. Considering the importance of mathematics education, particularly at secondary level cooperative learning can be said that a great need for research to test the impact on academic success. Therefore, the purpose of carrying out this research, cooperative learning technique with the method of learning is examined the effects of 9. grade students' achievement in mathematics course.

2. Methods

Experimental study design with pre-test and post-test experimental and control group have been used in this research. The students who are for control group and experimental group were set up randomly. The GCD-IPPC subject, belonging to the numbers unit, was carried out with a prepared lesson plan according to cooperative learning method.Traditional teaching method with a prepared lesson plan was carried out in the control group. In this direction, suitable for the learning technique is presented to the experimental group students with cooperative learning activities in the implementation phase. Both experimental and control groups were applied a pretest (i.e., achievement test) before the experimental process to compare the levels of their prior knowledge to determine whether there is a significant difference between groups.

2.1 Sampling

Sample of the study is set up 57 students who study at a high school in 9/B and 9/A classes in the second semester of the 2010-2011 school year. The reason of taking 9/A and 9/B classes is the two classes' students have the similar mean achiviment knowledge given by school managment.

2.2 Data Collection Tool and Analysis of Data

Achievement test was prepared to measure the students' knowledges about GCD-IPPC and their achievement in the end of the research was prepared for applying as pre-test and post-test in experimental and control groups. There are 10 multiple-choice questions in this test. Mathematics teachers and the instructors in this field are asked to verify the content validity of the test and it has been guaranteed that the test assesses the targeted subject in the teaching of mathematics program in the light of these views. The answers to the questions have been graded with 1 point if they were correct, the answers to the questions have been graded with 0 point if they were wrong or if no answer was given. Numeric data obtained by grading the questions have been evaluated in SPSS for Windows (Statistical Package for the Social Sciences) computer program. Cronbach's Alpha coefficient has been calculated and measurement reliability has been found as .81. It was informed to students in the experimental group about group work that learning together of cooperative learning techniques was applied during application and it was shown how to create these groups. Students in the experimental group (considering factors such as success, gender) divided into groups. After sharing the task, work sheets related to GCD-IPPC problems were distributed to the students in experimental group in mathematics class. During group work, researcher as a guider gave informations only about unclear points to the students. Mean scores of control groups and standard deviations of score distributions were calculated analyzing research data. Independent t-test was used in between-group comparisons. Score differences between the groups and wheter these score differences are significant during interpretations were based.

3. Findings

3.1 The analyses of achievement test

In this part, the findings emerging from the statistical analysis of data collected were analyzed according to the research problem. Before the research, pre tests were applied to both groups to determine wheter the levels of the students' knowledges about GCD-IPPC in experimental and control group are similar or not. After pre-test, then, main scores of groups of arithmetic averages, standard deviations, and whether there is significant difference between means was calculated by independent t -test. The datas obtained are shown in table 1.

Table 1. Pre-tests results

	Class	N	X	SD	t	p
Pre-test	C	25	22.40	13.928	.524	.603
	E	25	20.40	13.064		

When table-1 is examinated, arithmetic mean of experimental group is 22,40, arithmetic mean of control group is 20.40. When the pre-test results of the experimental and control groups are compared ,there is not a significant difference between the achievements of the groups according to the results of the independent t-test before the application ($t(48)=0,524$; $p>.05$). These findings shows that experimental group students, together learning technique which is based on cooperative learning method is applied, and control students , who traditional learning method is applied have knowledges about GCD-IPPC which are so close to each other. This situation shows that groups chosen for research have similar samples.

Table 2. Post-tests results

	Class	N	X	SD	t	p
Post-test	C	20	70.80	19.928	2.956	. 005
	E	20	52.40	23.854		

Table-2 shows that there is a significant difference between arithmetic mean scores obtained by students in experimental and control group. Independent t- test was calculated to determine whether this defference is significant or not and it was found that this value was ($t(48)=2.956$; $p<0,05$). This value has revealed whether there is no significant difference between means of both groups.

4. Conclusions and Suggestions

The results of this research showed that access levels between the experimental group which learning together was applied, and control group which traditional methods were applied a significant difference in secondary school 9 th grade math class. According to post-test scores, it was determined as statistical that achievement mean of the experimental groups is beter than achievement mean in the control group at the end of the study. It was thought that the most significant contribution to the achievement of cooperative learning groups is interaction between students (Şimşek, 1994). Literatüre supports that cooperative learning promotes achievement as well as other positive affective outcomes at the elementary and middle-grade levels (Johnson, Nelson, & Skon, 1981). Other researchers have reported similar findings that point to the achievement benefits associated with studying mathematics in cooperative learning groups at lower grade levels (Johnson, Maruyuma, Edwards, Devries, & Snyder, 1972). This study was made by the help of the together learning technique which is based on cooperative learning method to examine the 9 th grade effect on students' achievements in mathematics class. A similar study on can be researched for different courses, subjects and grade levels. The other cooperative learning techniques' effects on achivement of the students can be examined in future researches.

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